

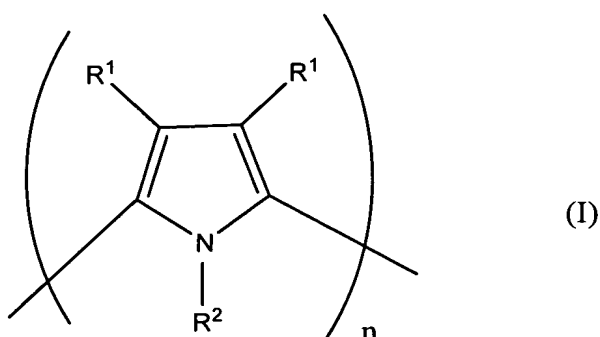
CLAIMS

What is claimed is:

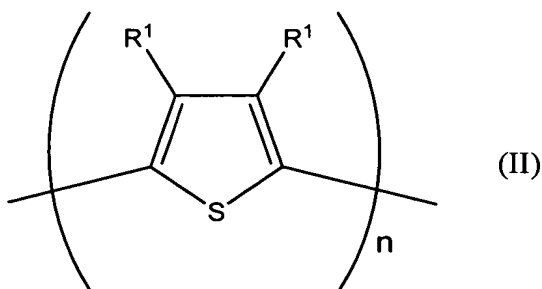
1. A composition comprising a polymer selected from at least one polypyrrole, one polythiophene, or mixtures thereof, at least one colloid-forming polymeric acid, and at least one organic liquid.

2. The composition of claim 1 wherein the composition further comprises at least one colloid-forming polymeric acid dispersed in a liquid medium, wherein the liquid medium comprises at least 60% by weight of an organic liquid.

3. A composition according to claim 1, wherein said polypyrrole has Formula I



- and said polythiophene has Formula II



- where in Formula I and Formula II:

R^1 is independently selected so as to be the same or different at each occurrence and is selected from hydrogen, alkyl, alkenyl, alkoxy, alkanoyl, alkylthio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkylamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl,

- alkylsulfonyl, arylthio, arylsulfinyl, alkoxycarbonyl, arylsulfonyl, acrylic acid, phosphoric acid, phosphonic acid, halogen, nitro, cyano, hydroxyl, epoxy, silane, siloxane, alcohol, amidosulfonate, benzyl, carboxylate, ether, ether carboxylate, ether sulfonate, and urethane; or both R¹ groups together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, sulfur or oxygen atoms; and
- n is at least 4;
- where in Formula I:
- R² is independently selected so as to be the same or different at each occurrence and is selected from hydrogen, alkyl, alkenyl, aryl, alkanoyl, alkylthioalkyl, alkylaryl, arylalkyl, amino, epoxy, silane, siloxane, alcohol, amidosulfonate, benzyl, carboxylate, ether, ether carboxylate, ether sulfonate, sulfonate, and urethane.
4. A composition according to Claim 3, wherein R¹ is the same or different at each occurrence and is independently selected from hydrogen, alkyl, alkenyl, alkoxy, cycloalkyl, cycloalkenyl, alcohol, amidosulfonate, benzyl, carboxylate, ether, ether carboxylate, ether sulfonate, sulfonate, urethane, epoxy, silane, siloxane, and alkyl substituted with one or more of sulfonic acid, carboxylic acid, acrylic acid, phosphoric acid, phosphonic acid, halogen, nitro, cyano, hydroxyl, epoxy, silane, or siloxane moieties.
5. A composition according to Claim 3, wherein R² is selected from hydrogen, alkyl, and alkyl substituted with one or more of sulfonic acid, carboxylic acid, acrylic acid, phosphoric acid, phosphonic acid, halogen, cyano, hydroxyl, epoxy, silane, or siloxane moieties.
6. A composition according to Claim 3, wherein the polymer is a polypyrrole having Formula I and R¹ and R² are hydrogen.
7. A composition according to Claim 3, wherein both R¹ together form a 6- or 7-membered alicyclic ring, which is further substituted with a group selected from alkyl, heteroalkyl, alcohol, amidosulfonate, benzyl, carboxylate, ether, ether carboxylate, ether sulfonate, sulfonate, and urethane.
8. A composition according to Claim 3, wherein the polymer is a polythiophene having Formula II and R¹ together form -O-(CHY)_m-O-, where m is 2 or 3, and Y is the same or different at each occurrence and is selected from hydrogen, alkyl, alcohol, amidosulfonate, benzyl,

carboxylate, ether, ether carboxylate, ether sulfonate, sulfonate, and urethane.

9. A composition according to Claim 8, wherein all Y are hydrogen and m is 2.

5 10. A composition according to Claim 1, wherein said colloid-forming polymeric acid comprises an acid that is selected from polymeric sulfonic acids, polymeric carboxylic acids, polymeric acrylic acids, polymeric phosphoric acids, polymeric phosphonic acids, and mixtures thereof.

10 11. A composition according to Claim 1 having a pH of from 1 to 8.

12. A composition according to Claim 1, wherein said composition further comprises at least one selected from a conductive polymer, metal particles, graphite fibers, graphite particles, carbon nanotubes, carbon nanoparticles, metal nanowires, organic conductive inks, organic
15 conductive pastes, inorganic conductive inks, inorganic conductive pastes, charge transport materials, semiconductive inorganic oxide nano-particles, insulating inorganic oxide nano-particles, piezoelectric oxide nano-particles, piezoelectric polymers, pyroelectric oxide nano-particles, pyroelectric polymers, ferroelectric oxide nano-particles, ferroelectric
20 polymers, dispersing agents, crosslinking agents and combinations thereof.

13. A composition according to Claim 12, wherein said polymeric sulfonic acid comprises a perfluoroalkylenesulfonic acid.

14. A method for producing a composition comprising:
25 polymerizing at least one monomer selected from a pyrrole, a thiophene, or a combination thereof in the presence of at least one colloid-forming polymeric acid in an aqueous liquid medium, to form an aqueous dispersion,

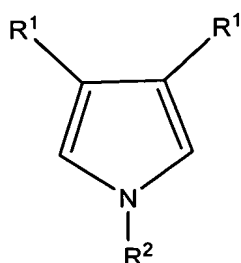
removing an amount of aqueous liquid medium from the
30 aqueous dispersion to form partially dried solids, and
dispersing the partially dried solids in at least one high boiling organic liquid.

15. A method according to Claim 14 wherein polymerization is carried out by forming a combination of water, at least one monomer
35 selected from a pyrrole, a thiophene, or mixtures thereof, at least one colloid-forming polymeric acid, and at least one oxidizing agent, catalyst or mixtures, in any order, provided that at least a portion of the colloid-

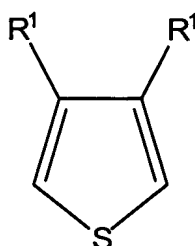
forming polymeric acid is present when at least one of the monomer and the oxidizer, catalyst or mixture is added.

16. A method according to Claim 14, wherein the colloid-forming polymeric acid is selected from polymeric sulfonic acids, polymeric carboxylic acids, polymeric acrylic acids, polymeric phosphoric acid, polymeric phosphonic acids, and mixtures thereof.

17. A method according to Claim 14, wherein said pyrrole monomer has Formula Ia and said thiophene monomer has Formula IIa:



(Ia)



(IIa)

wherein in Formula Ia and Formula IIa:

R¹ is independently selected so as to be the same or different at each occurrence and is selected from hydrogen, alkyl, alkenyl, alkoxy, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkylamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, arylthio, arylsulfinyl, alkoxycarbonyl, arylsulfonyl, acrylic acid, phosphoric acid, phosphonic acid, halogen, nitro, cyano, hydroxyl, epoxy, silane, siloxane, alcohol, amidosulfonate, benzyl, carboxylate, ether, ether carboxylate, ether sulfonate, and urethane; or both R¹ groups together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, sulfur or oxygen atoms; and where in Formula I:

R² is independently selected so as to be the same or different at each occurrence and is selected from hydrogen, alkyl, alkenyl, aryl, alkanoyl, alkylthioalkyl, alkylaryl, arylalkyl, amino, epoxy, silane, siloxane, alcohol, amidosulfonate, benzyl, carboxylate, ether, ether carboxylate, ether sulfonate, sulfonate, and urethane.

18. A method according to Claim 14, wherein said organic liquid has a boiling point of at least 100°C.

19. A method according to Claim 14, wherein said organic liquid is selected from glycols, glycol ethers, alcohols, alcohol ethers, cyclic ethers, ketones, nitriles, sulfoxides, amides, and combinations thereof.

20. A method according to Claim 14, wherein said organic liquid is
5 selected from N-methylpyrrolidone, ethylene glycol, dimethylacetamide, dimethyl formamide, dimethylsulfoxide, and combinations thereof.

21. A method according to Claim 14, further comprising adding at least one selected from a conductive polymer, metal particles, graphite
10 fibers, graphite particles, carbon nanotubes, carbon nanoparticles, metal nanowires, organic conductive inks, organic conductive pastes, inorganic conductive inks, inorganic conductive pastes, charge transport materials, semiconductive inorganic oxide nano-particles, insulating inorganic oxide nano-particles, piezoelectric oxide nano-particles, piezoelectric polymers, pyroelectric oxide nano-particles, pyroelectric polymers, ferroelectric
15 oxide nano-particles, ferroelectric polymers, dispersing agents, crosslinking agents and combinations thereof.

22. An organic electronic device comprising a layer comprising the composition of Claim 1.

23. An organic electronic device according to Claim 2 wherein said
20 device is selected from a photosensor, photoswitch, phototransistor, photoconductive cell, photoresistor, biosensor, phototube, IR detectors, photovoltaic device, solar cell, light-emitting diode, light-emitting diode display, electrochromic display, thin film transistor, electromagnetic shielding device, photodiode, solid electrolyte capacitors, field effect
25 resistance device, memory storage device, and diode laser.